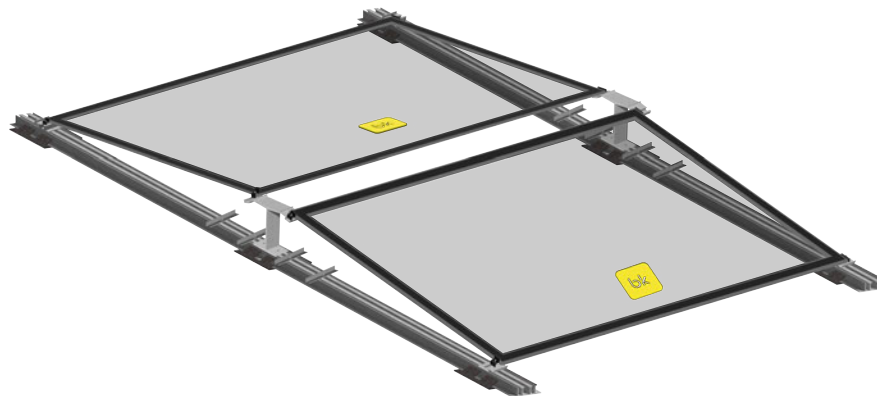
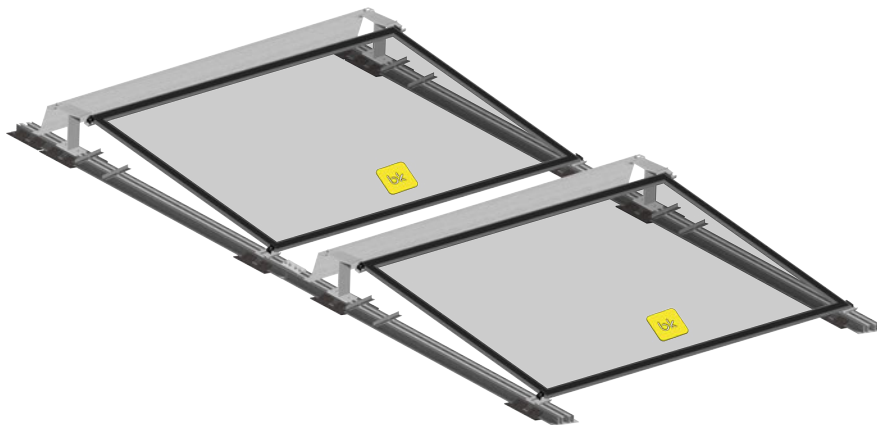




INSTALLATION MANUAL

FLAT ROOF SUBSTRUCTURE IROC® S3/OW3 10° + 15°

Status: June 2024



1. Introduction

We are pleased that you have chosen a product from "B & K Solare Zukunft" and thank you for your trust. Before the first installation, we recommend training at our site.

The IROC® substructure system is used to mount solar modules on flat roofs up to a 10° roof pitch (>10° on request). The modules are secured by module clamps.

Please check the completeness of the parts using your delivery note before starting construction

Compliance with this installation manual is a condition for warranty assurance.



Legal, Regulations, and Technical Rules

When setting up solar systems, the applicable laws and regulations at the state, federal, and European or international level must be observed. Generally, the generally accepted rules of technology apply, which are usually formulated in the form of standards, guidelines, regulations, requirements, and technical rules by state and federal organizations, utility companies, as well as professional associations and committees for the relevant field.

The entire PV system must be installed according to the generally accepted rules of technology. Please observe the accident prevention regulations of the professional associations (professional association regulations for safety and health at work), in particular:

BGV A1	General Regulations
BGV A2	Electrical Installations and Equipment
BGV A3	Electrical Installations and Equipment
BGV C22	Construction Work
BGV D36	Ladders and Steps



Please observe all public law regulations and requirements, DIN standards, TAB (technical connection conditions), accident prevention regulations, the guidelines of the Association of Property Insurers (VDE guidelines for fire protection), the professional rules of the German roofing trade, and general guidelines (e.g., timber structures, roofing, and roof sealing work) in the planning, construction, operation, and maintenance of grid-connected PV systems.

This includes (but is not limited to):

DIN / VDE 0100 especially part 712 (Installation of High-Voltage Systems with Nominal Voltages up to 1000V)

DIN / VDE 0289 (Electrical Cables)

VDI 6012 (Decentralized Energy Systems in Buildings - Photovoltaics)

DIN / VDE 0185 Part 1- 4 (Lightning Protection)

DIN 1055 Part 4 (Wind Loads)

EN 1991-1-4 (Wind Loads Eurocode 1)

DIN 1055 Part 5 (Snow Loads)

EN 1991-1-3 (Snow Loads Eurocode 1)

DIN 18338 Roofing and Roof Sealing Work

DIN 18451 Scaffolding Work

DIN 1052 Part 1 and Part 2 Dimensioning of Substructures (Timber Structures)

TAB (Technical Connection Conditions of Utility Companies)

DIN 18015 (Planning and Installation of Electrical Installations in Residential Buildings)

VDEW-Guideline for Connection and Parallel Operation of Self-Generating Systems on the Low Voltage Grid

DIN 4108 Thermal Insulation

Energy Saving Ordinance (ENEV)



IMPORTANT NOTICES

Unauthorized changes and improper use of our components during installation and construction will exclude any liability claims. We would like to remind you again that all work on the roof must comply with the relevant accident prevention regulations (UVV), such as VBG 37 Construction Work, § 12 Fall Protection.

Additionally, please note that before planning and constructing the system, the building ground (statics, rafters, battens) or the roof covering or membrane of the roof must be checked for suitability and tightness.

When using additional underlays (e.g., protective mats), ensure that water drainage is unobstructed to prevent dirt accumulation or moss formation. The use of additional underlays increases the distance of the system from the roof, which can negatively impact the statics due to wind. This value must be included in the calculation of statics/ballasting.



Professional and Knowledge Requirements of Processors and Installers

B & K Solare Zukunft assumes that installation is only carried out by professionally qualified personnel with recognized training certificates (by a state or federal organization) or corresponding knowledge for the respective field.

The IROC® flat roof substructure system has been statically verified for the following conditions:

Load capacity: **OW3 = 300kg /unit**

S3 = 150kg/unit

Wind load zone 4

Maximum roof pitch of 10° > 10° on request



Edge Distance

The roof should be divided into the following areas:

The IROC® S3 / OW3 can be installed up to the roof edge, but a safety and ballasting edge distance (building edge) of 700mm is recommended.



Prerequisites and Ballasting

The IROC® flat roof system must be ballasted depending on the wind load zone, terrain category, and building height.

The IROC® substructure system is considered a "low ballast system," but additional ballasting against lifting or shifting of the system is still required. A project-specific ballast plan is created using measurements, photos, and your completed checklist.

The values determined for the IROC® flat roof substructure by the Institute for Industrial Aerodynamics in Aachen (IFI) are used as a basis.

For membrane roofs, it is important to know the manufacturer data and ensure that installation with the IROC® substructure system is possible on this membrane. For membrane roofs with insulation, it is essential to know the compressive load limit in, for example, N/mm² to avoid damage to the roof.

Depending on the material used, the following calculation standards apply for design and planning:

DIN 4113-1 (Aluminum Structures)

DIN 1052-2 (Timber Structures)

DIN 18334 (Carpentry and Timber Structures)

DIN 18360 (Metal Construction Work)

DIN 18800 (Steel Structures, Dimensioning, and Construction)

The clamping of the modules in this installation system is done on the short side of the module frame. The approval of the used module type for the specified clamping area must be checked.



Installation Variants

The IROC® flat roof system can be installed in a south or east-west orientation.

System Components 10 °

- 1** IROC® S3 10°:
Base profile 5000mm (Art. No. 10018) or 3330 mm (Art. No. 10029) or 1665 mm (Art. No. 10028)
IROC® OW3 10°:
Base profile 5000mm (Art. No. 10018) or 2500mm (Art.No. 10019)
Module Carrier 10° (Art.No. 10135) incl. screw and nut
Module support 10° (Art.No.10111) incl. screw and nut
- 2** Pre-assembled connector incl. screw and nut (Art. No. 10160) to connect the base carriers in the longitudinal direction.
- 3** Protective mat, aluminum-coated, suitable for the base rail, notched. 250x180x12 (Art. No. 23943)
- 4** Middle clamp depending on module height
- 5** End clamp depending on module height
- 6** Wind deflector made of galvanized steel sheet in 4 different lengths for south or single east-west incl. fastening material (other lengths on request)

System Components 15 °

- 1** IROC® S3 15°:
Base profile 3740mm (Art. No. 10025) or 1870 mm (Art. No. 10026)
IROC® OW3 15°:
Base profile 5000mm (Art. No. 10018) or 2500mm (Art.No. 10019)
Module carrier 15° (Art.No. 10131) incl. screw and nut
Module support 15° (Art.No.10110) incl. screw and nut
- 2** Pre-assembled connector incl. screw and nut (Art. No. 10160) to connect the base carriers in the longitudinal direction.
- 3** Protective mat, aluminum-coated, suitable for the base rail, notched. 250x180x12 (Art. No. 23943)
- 4** Middle clamp depending on module height
- 5** End clamp depending on module height
- 6** Wind deflector made of galvanized steel sheet in 4 different lengths for south or single east-west incl. fastening material (other lengths on request)



Tool List

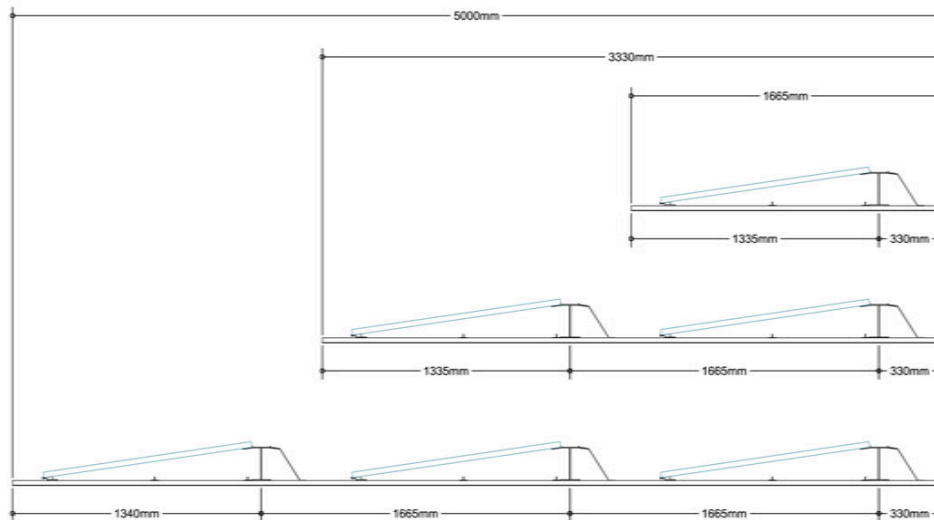
- 1** Marker and chalk line
- 2** Folding rule and tape measure
- 3** Hexagon head M13
- 4** Hexagon socket M6
- 5** Cordless drill with hexagon head M13

Installation Variant South IROC® S3

1

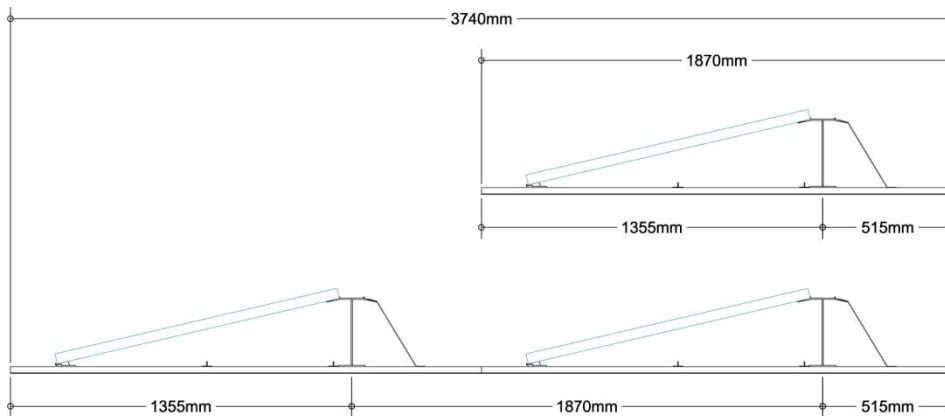
Lay out the base rail, mount the module carrier as follows:

S3 10°



Mount the bottom module support according to dimension A (+5mm), corresponds to module width + 5mm.

S3 15°





2

Lay out the protective mat under the base rail. The protective mat 250x180x12 (Art. No. 23943) must be laid out under the module carrier and the module support (see protective mat plan).

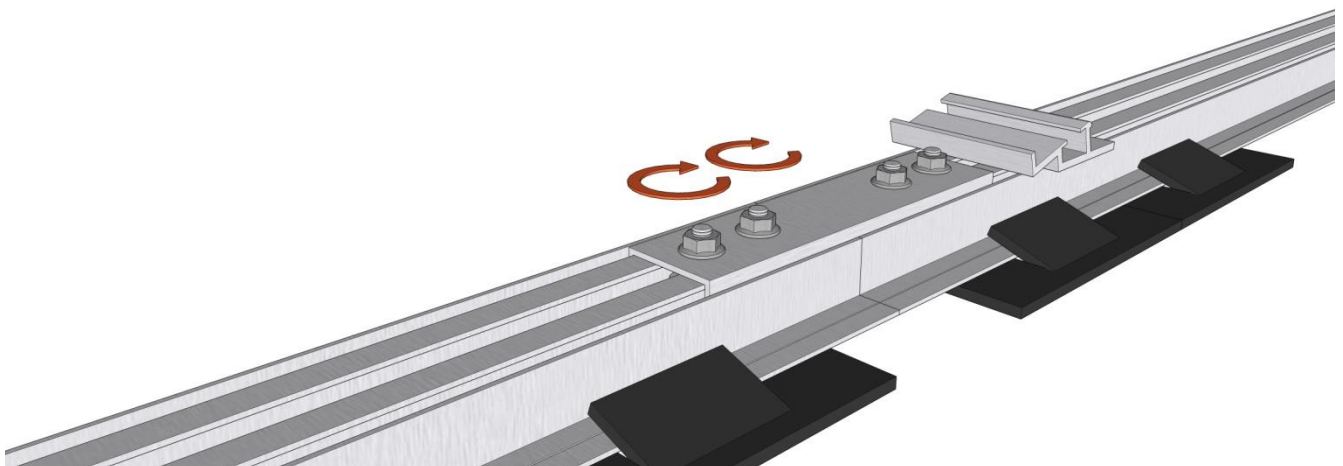


3

Connect the base rails with the rail connector (connection points according to the ballast plan).

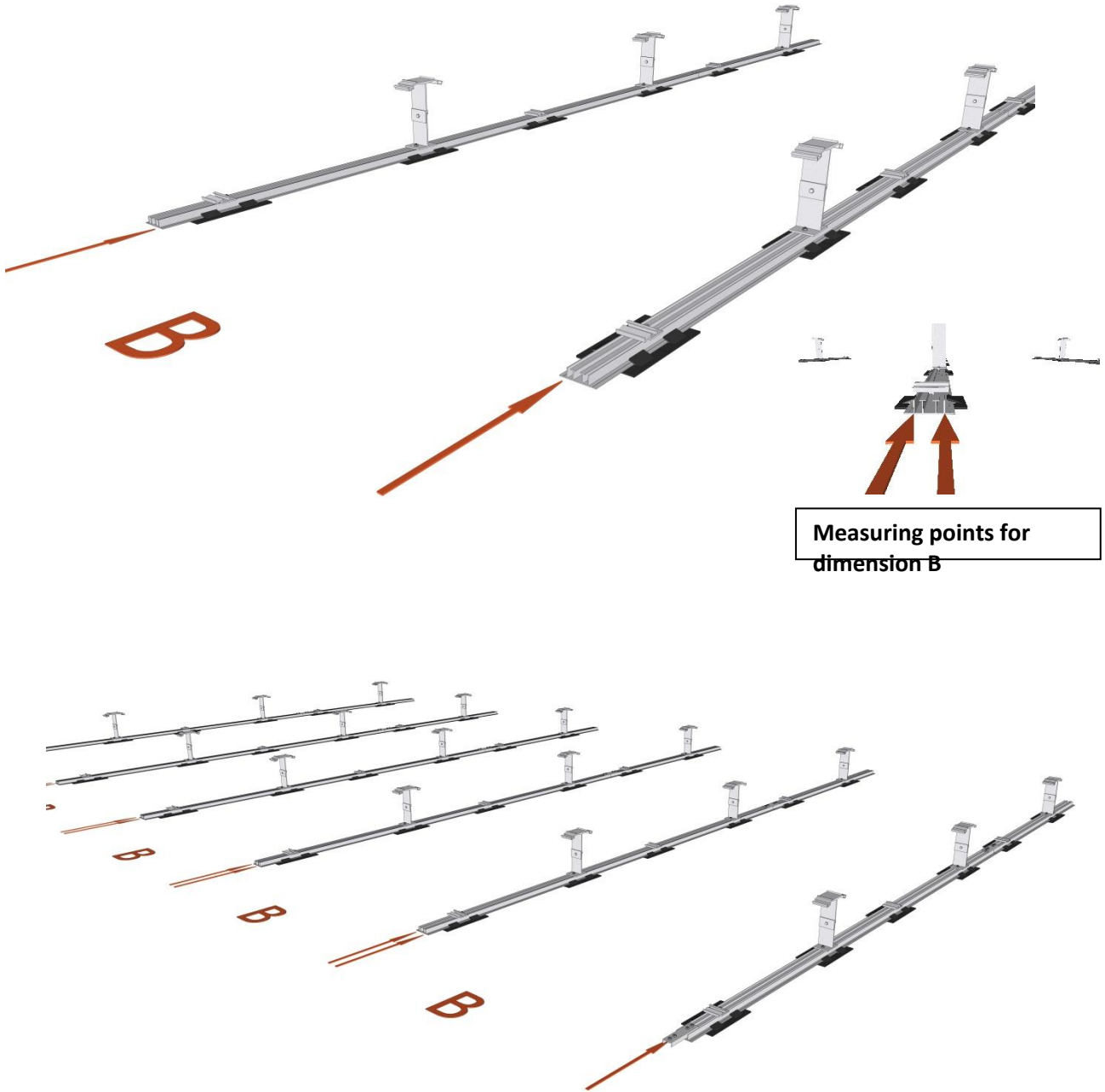


The base rails at flexible connection points must be installed according to the table "Expansion Joint Distances" (Connection points according to the ballast plan).



4

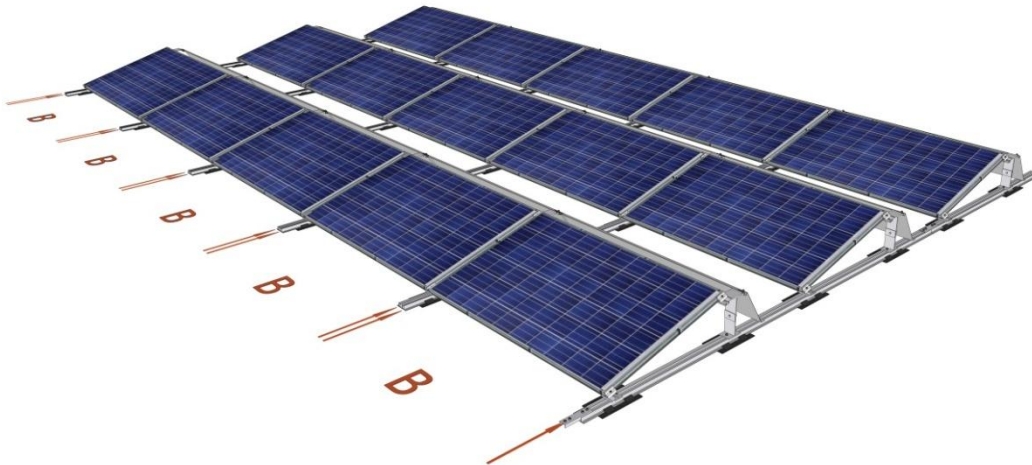
Lay out additional base rails according to dimension B.
Dimension B = (module width - 40mm).



Measuring points for dimension B

5

Assembly of the solar modules



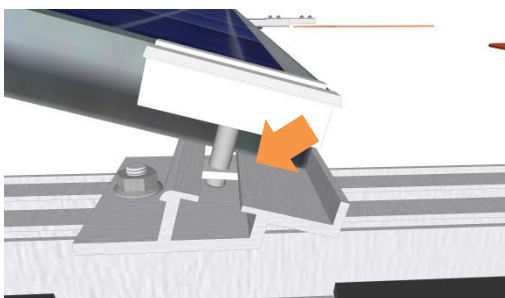
Attachment point for end clamp.



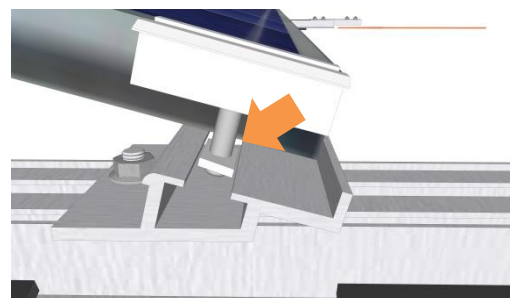
Attachment point for middle clamp.

Important!

When installing the clamp, ensure the correct seating of the threaded plate!



Correct



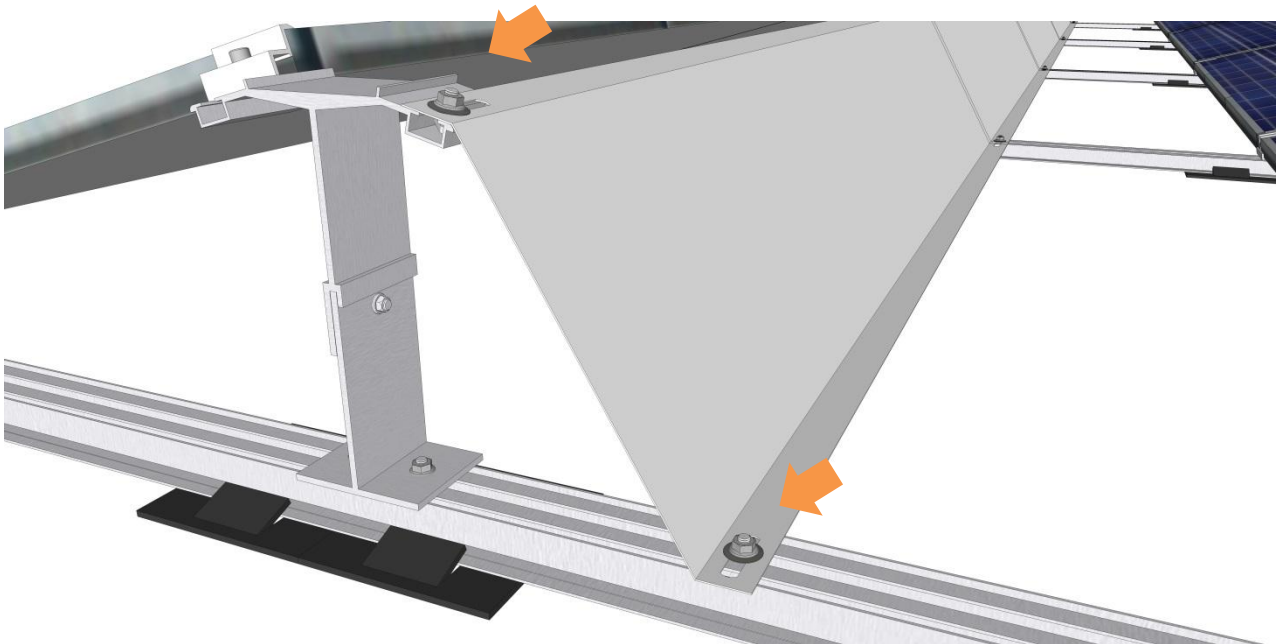
Incorrect

6

Installation of the wind deflectors.



The attachment is done using hammerhead screws M8x20 (Art. No. 21922), washers 8.4x25 (Art. No. 21909), and locknuts (Art. No. 21915).



7

Distribution of the ballast (please strictly follow the specifications in the ballast plan). Use the supplied T-profiles for ballasting.



Distribution of the stones (according to the ballast plan).

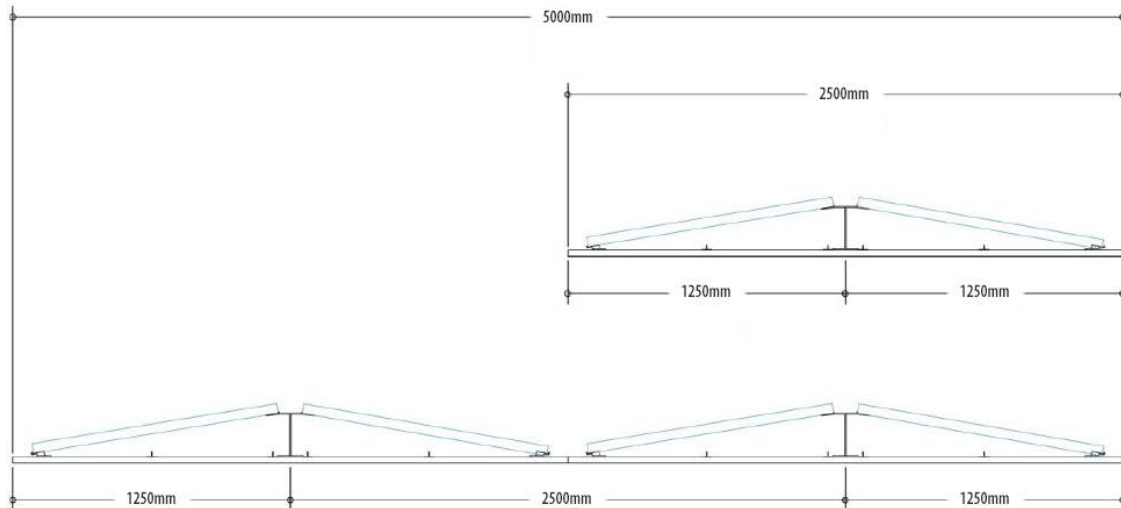


Installation Variant East-West

Lay out the base rail, mount the module carrier as follows:

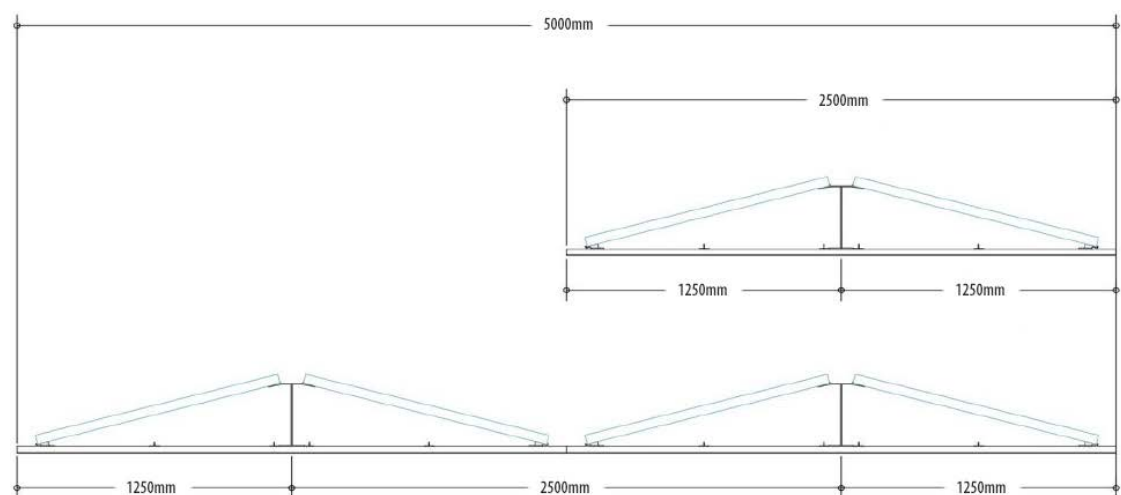
1

O/W3 10°



Mount the bottom module support according to dimension A (+5mm), which corresponds to module width + 5mm.

O/W3 15°



**2**

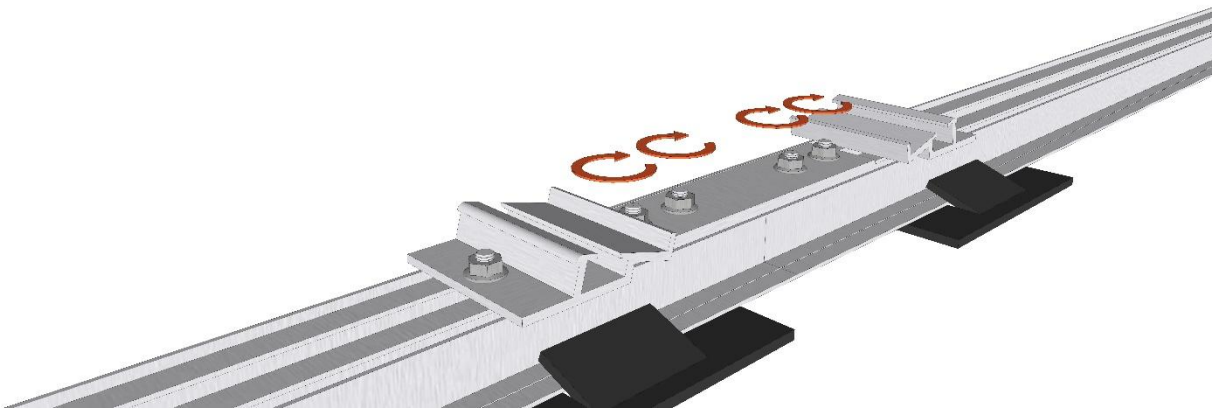
Lay out the protective mat under the base rail.

(see protective mat plan).

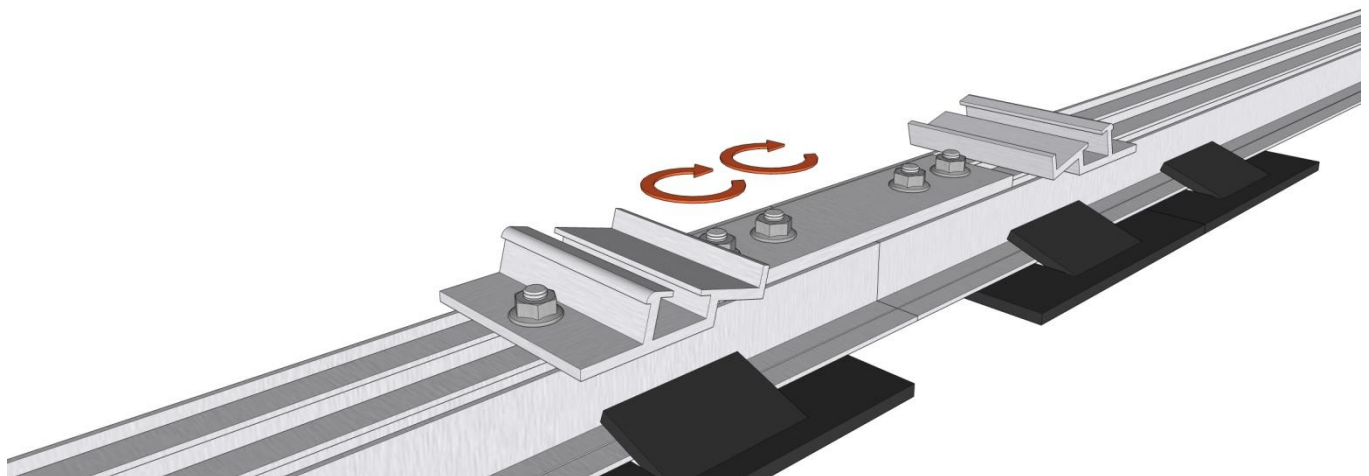


3

Connect the base rails with the rail connector (connection points according to the ballast plan).

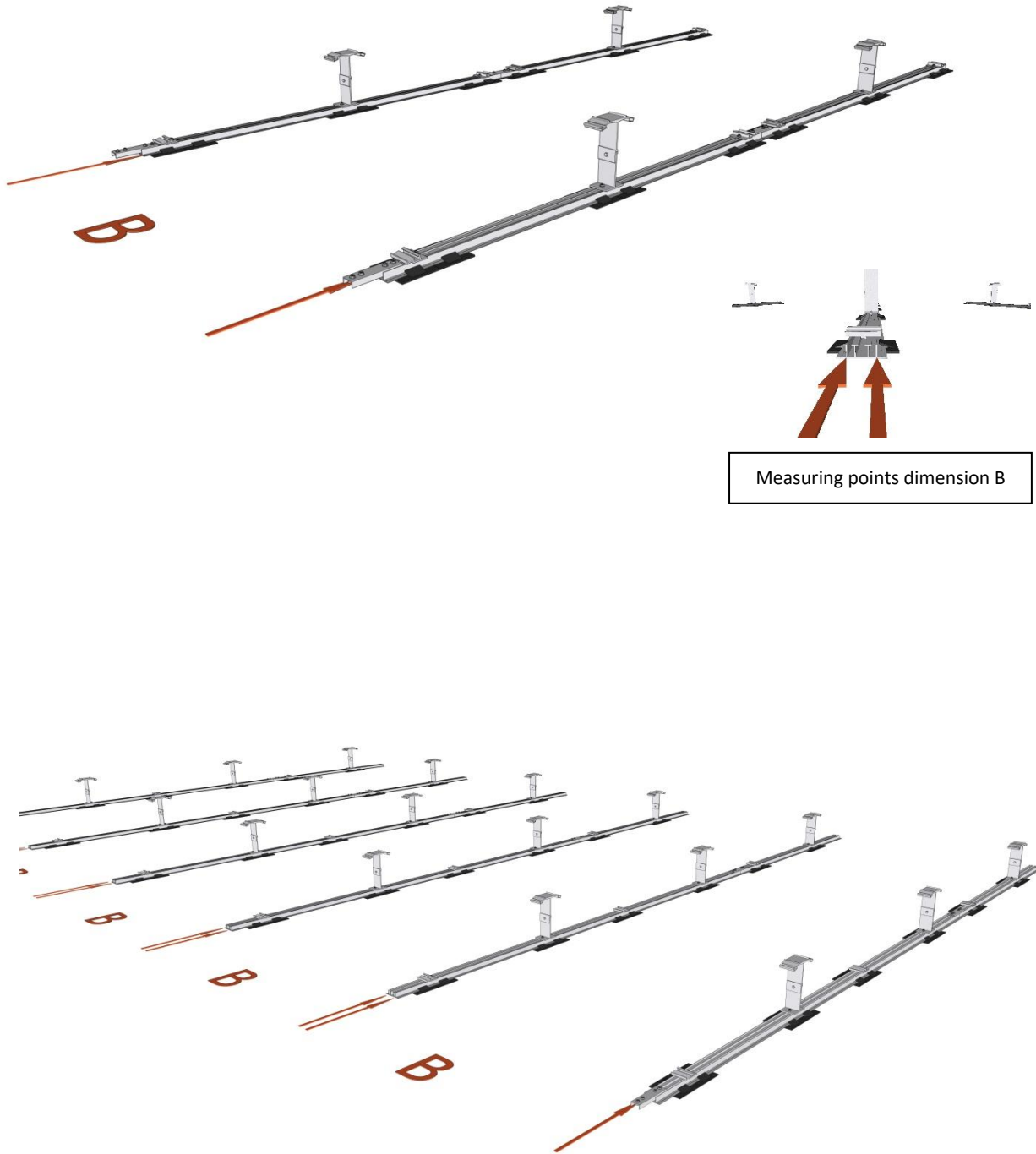


The base rails at flexible connection points must be installed according to the table "Expansion Joint Distances" (Connection points according to the ballast plan).



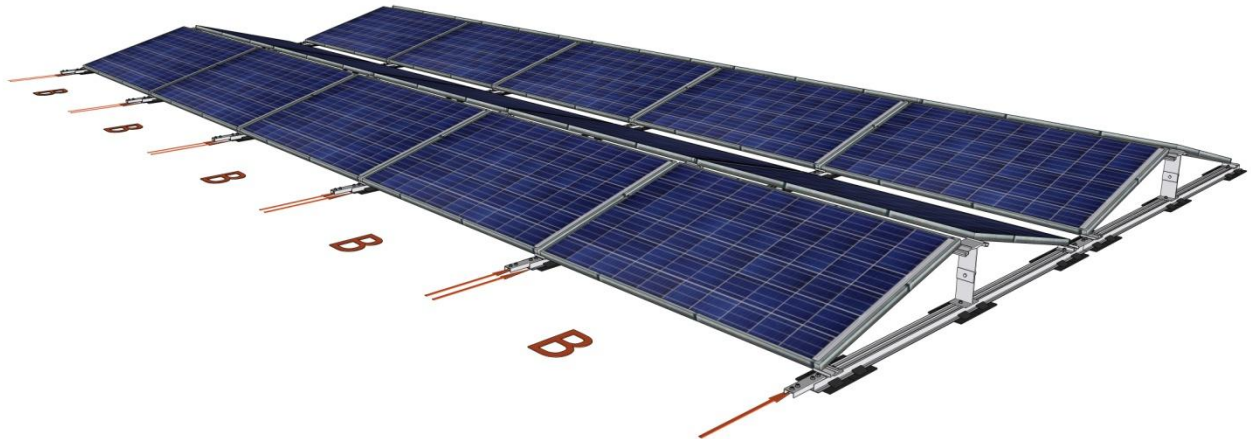
4

Lay out additional base rails according to dimension B.
Dimension B = (module width - 40mm).



Installation of the solar modules.

5



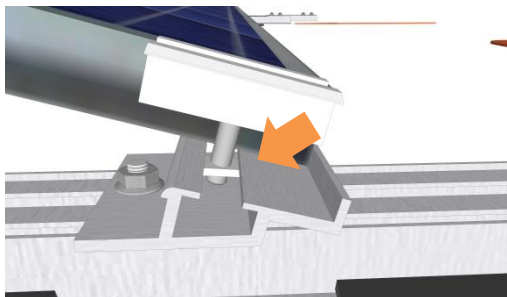
Attachment point for middle clamp.



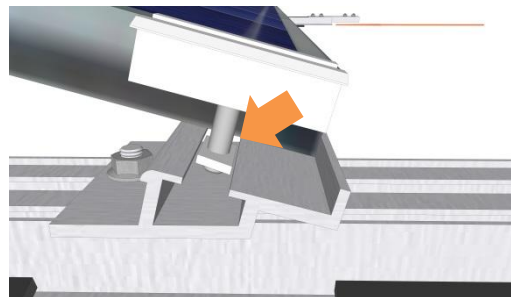
Attachment point for end clamp.

Important!

When installing the clamp, ensure the correct seating of the threaded plate!



Correct



Incorrect

6

Distribution of the ballast (please strictly follow the specifications in the ballast plan).
Use the supplied T-profiles for ballasting.



Distribution of the stones (according to the ballast plan).





Installation Notes

All screws must be tightened with a torque of approximately 15-22Nm! The exact values are temperature-dependent.

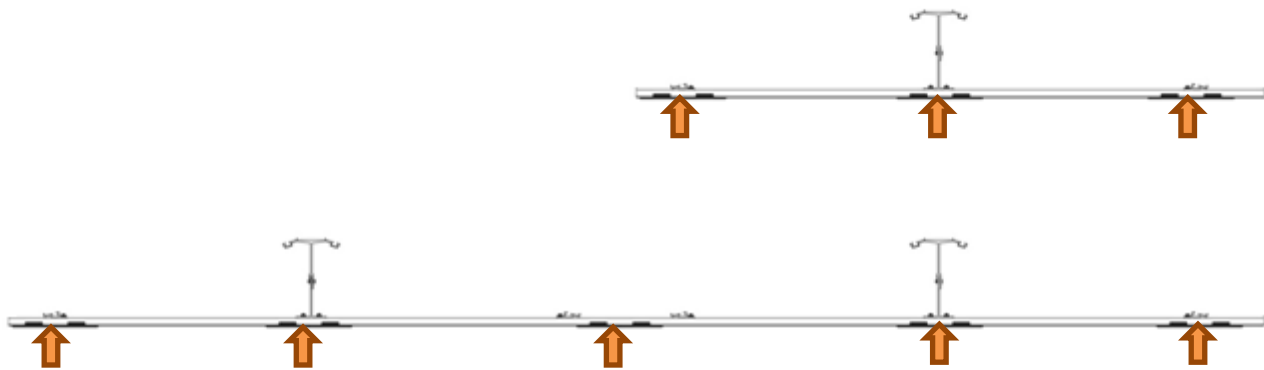
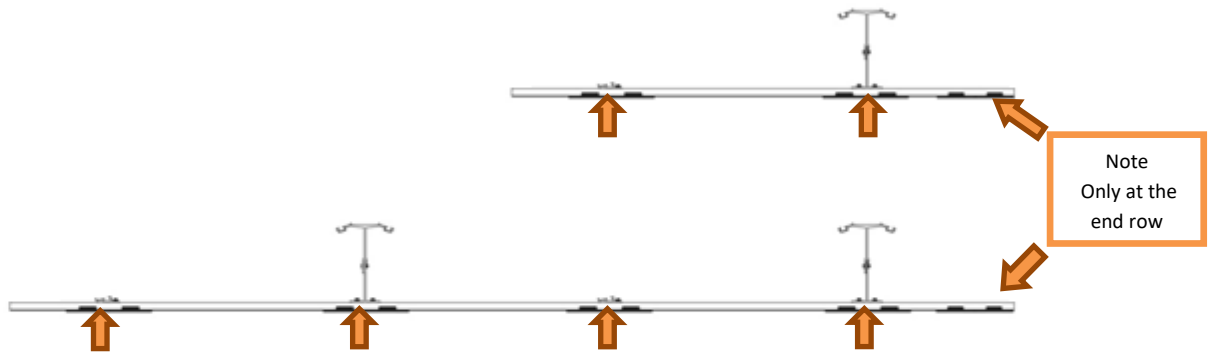
Please use the following table

Temperature [°C]	Tightening torque [Nm]		Expansion Joint Distances [mm] (flexible connection)
	Hexagon socket M8	Hexagon head M8	
40	20	22	0
35	19,5	21,5	2
30	19	21	4
25	18,5	20,5	6
20	18	20	8
15	17,5	19,5	10
10	17	19	12
5	16,5	18,5	14
0	16	18	16
-5	15,5	17,5	18
-10	15	17	20

Table on the dependence of torques and expansion distances (flexible connectors).
 IROC® flat roof system.

All components of the installation system must be placed on protective mats to avoid damage to the roof membrane.

Placement plan protective mat:





Lightning Protection Notice

Our system is capable of carrying lightning current (report available on request).

We point out that the lightning and surge protection of PV systems must comply with the current requirements:

**DIN / VDE 0185 Part 1 to 4,
DIN / VDE 0100 Part 100 and 712
DIN / EN 62305 Lightning Protection
DIN / VDE 0105 (operation of electrical systems)
DIN / VDE 0298 (electrical cables)
VdS 2**

For detailed instructions, please refer to the mentioned guidelines and standards.

In general, we recommend integrating the installation system and the module frames into the local potential equalization and using surge protection devices.

The cross-section of the potential equalization conductor must correspond to the cross-section of the DC main line, but at least 16mm² (copper).

Fire Protection

For the area of fire protection, the following guidelines must be observed:

VDS 2023 (guidelines for fire protection in buildings),

VDS 2024 (guidelines for fire protection for the installation of electrical equipment),

DIN 4102 fire behavior of building materials and components.

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